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EXAMINER

SIM, YONG H

ART UNIT

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2629

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |   |  |
|------------------------------|--------------------------------------|---|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/577,669 | <b>Applicant(s)</b><br>HASHIMOTO ET AL. |  |
|                              | <b>Examiner</b><br>YONG H. SIM       | <b>Art Unit</b><br>2629                 |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 August 2011.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 5) ☒ Claim(s) 1-6 is/are pending in the application.
- 5a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 7) ☒ Claim(s) 1-6 is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____.                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____.  | 6) <input type="checkbox"/> Other: ____.                          |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments filed 8/25/2011 have been fully considered but they are not persuasive.

With respect to the Applicant's argument regarding claim 1, the Applicant argues that Elliott and Kanou fail to teach "first, second and third subpixels emitting colored light of three different colors are arranged cyclically so as to repeat the three different colors every predetermined display pixel pitch at least in a predetermined cyclic arrangement direction."

However, Examiner respectfully disagrees. The Applicant specifically argues that Elliott merely teaches a converting pixel data to subpixel data for a display having first, second, and third subpixels emitting colored light of three different colors. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Elliott was introduced to overcome Kanou's deficiency of having a specific subpixel arrangement. As is well known in the art, and evidenced by Elliott, it is obvious for a display to have many different subpixel arrangements. As described in the previous Office Action, Kanou teaches all of the limitations with respect to the conversion portion of the

pixel data, Elliott thereby was combined to teach the subpixel arrangement to modify the single pixel of Kanou into subpixels. The combination obviously yields an image display device where subpixels emitting colored light of each color are arranged cyclically to take most any stored image and render it into any practicable color subpixel arrangement.

Further Elliot teaches the added limitations of first, second and third subpixels emitting colored light of three different colors as described in Para 0017 and Fig. 1.

With respect to the Applicant's argument regarding claim 4, the Applicant argue that Kanou fails to teach the ratio of an input pixel pitch to an output pixel pitch due to the fact Kanou fails to describe subpixel arrangement.

However, Examiner respectfully disagrees since Kanou in combination of Elliott teaches the alleged subpixel arrangement.

Therefore, argument is moot and the previous rejections are maintained.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. **Claims 1 – 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanou et al. (Hereinafter “Kanou” US 6,088,062) in view of Brown Elliott et al. (Hereinafter “Elliott” US 2003/0034992 A1).**

Regarding claim 1, Kanou teaches an image display device that includes a display screen where pixels emitting colored light are arranged cyclically so as to repeat every predetermined display pixel pitch at least in a predetermined cyclic arrangement

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direction and displays images on the display screen (See Fig. 1 for the pixel arrangement. Col. 2, lines 55 – 65; “with high definition television or conversion of the number of pixels...” Col. 58, lines 59 – 67; “pixel data of R, G, or B pixel data...”), the device comprising:

a data conversion portion for converting image data having input pixel data each of which is associated with each data point when the data points are arranged at a data pixel pitch smaller than the display pixel pitch in the cyclic arrangement direction to each pixel data corresponding to each of the pixels (Col. 6, lines 50 – 55; “In the enlarging conversion of the number of pixels by 2:3, three output pixels are created per two input pixels, as shown in Fig. 1 ... In the following explanation, the cubic interpolation of interpolation from a range of four points as the near-by range is taken as an example.” Fig. 1 shows the pixel phase information of the input and output pixel. The wider input pixel phase means smaller pixel pitch due to the lower resolution compared to the output pixel. See Fig. 1.  $R_i$  are data points.); and

and a display control portion for controlling the colored light of each of the pixels arranged in the display screen based on each of the pixel data that was converted by the data conversion portion, and thereby to display images on the display screen (A display control portion is inherently required to control the colored light of each pixel to display images on a display screen such as a high definition television described above),

the data conversion portion performs, for each of the pixels, an operation for generating pixel data corresponding to one of the pixels by adding weight depending on

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a distance between the center of the one of the pixels and each of the data points to plural color data corresponding to the colored light of the one of the pixels (Col. 7, lines 1 – 34; “The coefficients  $C_u(x)$  of the equation (2) are values calculated from the above-mentioned cubic interpolation functions, and are calculated from the phase specifying how much the output pixel to be found is deviated from the input pixel.” See Fig. 1 for the distance between the center of the output pixel and the plural input pixels. The equation show in Col. 7, lines 1 - 20 show the relationship between the distance and the weight and how they are combined together.),

among plural pixel data associated with the data points that are present within a predetermined area extending from the center of the one of the pixels to both sides in the cyclic arrangement direction, in a state where the data points are overlayed on the display screen in such a manner that the respective data points are off the respective centers of the one of the pixels in the cyclic arrangement direction (See Fig. 1 for the cyclic arrangement direction in both sides of the center of the one of the pixels/output pixel. The plural color data/ input pixels overlap with one of the pixels/output pixel.).

But Kanou does not expressly describe a first, second and third subpixels emitting colored light of three different colors are arranged cyclically so as to repeat the three different colors every predetermined display pixel pitch.

However, in a similar field of endeavor, Brown teaches a various subpixel arrangement wherein a source pixel data of a first format is converted for a display of a second format having a plurality of three-color pixel elements (Para 0017. Also See Fig. 1).

Therefore, taking the combined teachings of Kanou and Brown, as a whole, it would have been obvious to a person having ordinary skill in the art to incorporate the idea of having a subpixel arrangement for format conversion as taught by Brown into the image display device as taught by Kanou to obtain an image display device that includes a display screen where first, second and third subpixels emitting colored light of three different colors are arranged cyclically so as to repeat the three different colors every predetermined display pixel pitch to take most any stored image and render it onto any practicable color subpixel arrangement.

Regarding claim 2, Kanou and Brown teach the image display device according to claim 1, wherein the predetermined area is an area extending from the center of said one of the subpixel to both sides in the cyclic arrangement direction by an amount corresponding to one display pixel pitch respectively (Kanou: See Fig. 1 for the pixel pitch. The phase information corresponds to the pixel pitch and resolution relationship between the input and output pixels. The combination of Kanou and Brown yield the subpixel arrangement.) .

Regarding claim 3, Kanou and Brown teach the image display device according to claim 1, wherein, with respect to the cyclic arrangement direction, the data pixel pitch is represented by an equation:  $P_d = [(n-i)/n]P_o$  where  $P_o$  denotes the display pixel pitch,  $n$  denotes the number of subpixels within one display pixel pitch,  $P_d$  denotes the data pixel pitch and  $i$  is an integer ( $1 \leq i < n$ ) [Kanou: See Fig. 1. Col. 6, lines 50 – 55; “In the



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enlarging conversion of the number of pixels by 2:3, three output pixels are created per two input pixels, as shown in Fig. 1 ... In the following explanation, the cubic interpolation of interpolation from a range of four points as the near-by range is taken as an example.” Fig. 1 shows the pixel phase information of the input and output pixel. The wider input pixel phase means smaller pixel pitch due to the lower resolution compared to the output pixel. The 2:3 relationship between the input and output pixels satisfies the above equation in the even the integer is equal to 1.]

Regarding claim 4, Kanou and Brown teach the image display device according to claim 3, wherein when the number of subpixels  $n$  is three and the integer  $i$  is one, the data pixel pitch  $P_d$  is expressed as an equation:  $P_d = (2/3)P_o$  (Kanou: See Fig. 1. Col. 6, lines 50 – 55; “In the enlarging conversion of the number of pixels by 2:3, three output pixels are created per two input pixels, as shown in Fig. 1 ... In the following explanation, the cubic interpolation of interpolation from a range of four points as the near-by range is taken as an example.” Fig. 1 shows the pixel phase information of the input and output pixel. The wider input pixel phase means smaller pixel pitch due to the lower resolution compared to the output pixel. The 2:3 relationship between the input and output pixels satisfies the above equation in the even the integer is equal to 1.).

Regarding claim 5, Kanou teaches an image display device that includes a display screen where pixels emitting colored light are arranged cyclically so as to repeat every predetermined display pixel pitch at least in a predetermined cyclic arrangement

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direction and displays images on the display screen (See Fig. 1 for the pixel arrangement. Col. 2, lines 55 – 65; “with high definition television or conversion of the number of pixels...” Col. 58, lines 59 – 67; “pixel data of R, G, or B pixel data...”), the device comprising:

a data conversion portion for converting image data having pixel data each of which is associated with each data point when the data points are arranged at a data pixel pitch smaller than the display pixel pitch in the cyclic arrangement direction to each pixel data corresponding to each of the pixels (Col. 6, lines 50 – 55; “In the enlarging conversion of the number of pixels by 2:3, three output pixels are created per two input pixels, as shown in Fig. 1 ... In the following explanation, the cubic interpolation of interpolation from a range of four points as the near-by range is taken as an example.” Fig. 1 shows the pixel phase information of the input and output pixel. The wider input pixel phase means smaller pixel pitch due to the lower resolution compared to the output pixel. See Fig. 1.  $R_i$  are data points.),

and a display control portion for controlling the colored light of each of the pixels arranged in the display screen based on each of the pixel data that was converted by the data conversion portion, and thereby to display images on the display screen (A display control portion is inherently required to control the colored light of each pixel to display images on a display screen such as a high definition television described above).

wherein, the data conversion portion performs a first operation for each imaginary pixel corresponding to each of the pixels and a second operation for each of

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the pixels, the first operation being an operation for generating imaginary pixel data corresponding to one imaginary pixel corresponding to one the pixels by adding weight depending on the distance between the center of the one of the pixels and each of the data points to the plural pixel data associated with the data points that are present within a predetermined area extending from the center of the pixel to both sides in the cyclic arrangement direction (Col. 7, lines 1 – 34; “The coefficients  $C_u(x)$  of the equation (2) are values calculated from the above-mentioned cubic interpolation functions, and are calculated from the phase specifying how much the output pixel to be found is deviated from the input pixel.” See Fig. 1 for the distance between the center of the output pixel and the plural input pixels. The equation show in Col. 7, lines 1 - 20 show the relationship between the distance and the weight and how they are combined together. The calculated data is imaginary since the pixel data is calculated to an unknown value from known values by using interpolated/imaginary values.), in a state where the data points are overlaid on the display screen in such a manner that the respective data points are off the respective centers of the pixels in the cyclic arrangement direction (See Fig. 1 for the cyclic arrangement direction in both sides of the center of the one of the pixels/output pixel. The plural pixel data/ input pixels overlap with one of the pixels/output pixel.), the second operation being an operation for generating pixel data corresponding to the one of the pixels by combining the plural color data corresponding to the colored light of the pixel, and the plural color data constituting the plural imaginary pixel data that correspond to the imaginary pixel corresponding to the one of the pixel and imaginary pixels arranged around the

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imaginary pixel (Col. 14, lines 13 – 22; “since the two chroma signals are of the same format as the luminance signal, these two chroma signals can be processed in the same manner as the above-mentioned luminance signals.”).

But Kanou does not expressly describe a first, second and third subpixels emitting colored light of three different colors are arranged cyclically so as to repeat the three different colors every predetermined display pixel pitch.

However, in a similar field of endeavor, Brown teaches a various subpixel arrangement wherein a source pixel data of a first format is converted for a display of a second format having a plurality of three-color pixel elements (Para 0017).

Therefore, taking the combined teachings of Kanou and Brown, as a whole, it would have been obvious to a person having ordinary skill in the art to incorporate the idea of having a subpixel arrangement for format conversion as taught by Brown into the image display device as taught by Kanou to obtain an image display device that includes a display screen where first, second and third subpixels emitting colored light of three different colors are arranged cyclically so as to repeat the three different colors every predetermined display pixel pitch to take most any stored image and render it onto any practicable color subpixel arrangement.

Regarding claim 6, Kanou teaches an image display method for an image display device that includes a display screen where pixels emitting colored light of each color are arranged cyclically so as to repeat every predetermined display pixel pitch at least in a predetermined cyclic arrangement direction and displays images on the display

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screen (See Fig. 1 for the pixel arrangement. Col. 2, lines 55 – 65; “with high definition television or conversion of the number of pixels...” Col. 58, lines 59 – 67; “pixel data of R, G, or B pixel data...”), the method comprising:

performing, for each of the pixels, an operation for generating pixel data corresponding to one of the pixels by adding weight depending on a distance between the center of the one of the pixels and each of the data points to plural color data corresponding to the colored light of the one of the pixel and combining the plural color data together (Col. 7, lines 1 – 34; “The coefficients  $C_u(x)$  of the equation (2) are values calculated from the above-mentioned cubic interpolation functions, and are calculated from the phase specifying how much the output pixel to be found is deviated from the input pixel.” See Fig. 1 for the distance between the center of the output pixel and the plural input pixels. The equation show in Col. 7, lines 1 - 20 show the relationship between the distance and the weight and how they are combined together.),

among plural pixel data associated with the data points that are present within a predetermined area extending from the center of the one of the pixel to both sides in the cyclic arrangement direction, the state being a state where data points are aligned at a data pixel pitch smaller than the display pixel pitch in the cyclic arrangement direction and are overlaid on the display screen in such a manner that the respective data points are off the respective centers of the pixels in the cyclic arrangement direction (See Fig. 1 for the cyclic arrangement direction in both sides of the center of the one of the pixels/output pixel. The plural color data/ input pixels overlap with one of the pixels/output pixel.); controlling the colored light of each of the pixels arranged in the

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display screen based on each of the pixel data generated by the operation; and displaying images on the display screen (A display control portion is inherently required to control the colored light of each pixel to display images on a display screen such as a high definition television described above).

But Kanou does not expressly describe a first, second and third subpixels emitting colored light of three different colors are arranged cyclically so as to repeat the three different colors every predetermined display pixel pitch.

However, in a similar field of endeavor, Brown teaches a various subpixel arrangement wherein a source pixel data of a first format is converted for a display of a second format having a plurality of three-color pixel elements (Para 0017. Also see Fig. 1).

Therefore, taking the combined teachings of Kanou and Brown, as a whole, it would have been obvious to a person having ordinary skill in the art to incorporate the idea of having a subpixel arrangement for format conversion as taught by Brown into the image display method for an image display device as taught by Kanou to obtain an image display method for an image display device that includes a display screen where first, second and third subpixels emitting colored light of three different colors are arranged cyclically so as to repeat the three different colors every predetermined display pixel pitch to take most any stored image and render it onto any practicable color subpixel arrangement.

***Conclusion***

2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YONG H. SIM whose telephone number is (571)270-1189. The examiner can normally be reached on Monday - Friday (Alternate Fridays off) 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/YONG H SIM/  
Primary Examiner, Art Unit 2629  
11/4/2011